

**NORTH CAROLINA DIVISION OF
AIR QUALITY**

Application Review

Issue Date: TBD

Region: Raleigh Regional Office
County: Person
NC Facility ID: 7300045
Inspector's Name: Matthew Mahler
Date of Last Inspection: 06/28/2017
Compliance Code: 3 / Compliance - inspection

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| <p style="text-align: center;">Facility Data</p> <p>Applicant (Facility's Name): Duke Energy Progress, LLC - Mayo Electric Generating Plant</p> <p>Facility Address: Duke Energy Progress, LLC - Mayo Facility 10660 Boston Road Roxboro, NC 27574</p> <p>SIC: 4911 / Electric Services NAICS: 221112 / Fossil Fuel Electric Power Generation</p> <p>Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V</p> | <p style="text-align: center;">Permit Applicability (this application only)</p> <p>SIP: 02Q .0317 NSPS: n/a NESHAP: n/a PSD: n/a PSD Avoidance: limit removed NC Toxics: n/a 112(r): n/a Other: Removed PSD avoidance limit</p> |
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| Contact Data | | | Application Data |
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| <p style="text-align: center;">Facility Contact</p> Herbert Lea, Sr. EHS Professional (336) 597-7309 1700 Dunnaway Road Roxboro, NC 27574 | <p style="text-align: center;">Authorized Contact</p> Tom Copolo Station Manager (336) 597-7307 10660 Boston Road Roxboro, NC 27574 | <p style="text-align: center;">Technical Contact</p> Erin Wallace Environmental Professional II (919) 546-5797 410 South Wilmington Street Raleigh, NC 27601 | <p>Application Number: 7300045.17B Date Received: 06/19/2017 Application Type: Modification Application Schedule: TV-Significant</p> <p style="text-align: center;">Existing Permit Data</p> <p>Existing Permit Number: 03478/T46 Existing Permit Issue Date: 05/26/2017 Existing Permit Expiration Date: 11/30/2021</p> |

Total Actual emissions in TONS/YEAR:

| CY | SO2 | NOX | VOC | CO | PM10 | Total HAP | Largest HAP |
|------|---------|---------|-------|--------|--------|-----------|-------------------------------------------|
| 2015 | 2484.20 | 2590.72 | 41.32 | 347.04 | 331.13 | 9.91 | 4.98 [Hydrogen chloride (hydrochlori)] |
| 2014 | 3490.60 | 2169.82 | 35.74 | 286.79 | 254.81 | 5.40 | 1.48 [Cyanide & compounds (see also)] |
| 2013 | 4570.21 | 2648.27 | 35.78 | 300.87 | 252.55 | 4.78 | 1.48 [Cyanide & compounds (see also)] |
| 2012 | 6060.73 | 2968.76 | 45.25 | 387.74 | 335.02 | 6.90 | 2.25 [Hydrogen chloride (hydrochlori)] |
| 2011 | 7235.33 | 1510.63 | 46.90 | 395.38 | 352.80 | 6.23 | 1.94 [Cyanide & compounds (see also)] |

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| <p>Review Engineer: Russell Braswell</p> <p>Review Engineer's Signature: _____ Date: _____</p> | <p style="text-align: center;">Comments / Recommendations:</p> <p>Issue 03478/T47 Permit Issue Date: TBD Permit Expiration Date: TBD</p> |
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1. Purpose of Application:

Duke Energy Progress, LLC – Mayo Electric Generating Plant (Duke) is a coal-fired electric generating utility and currently operates under Title V Air Quality Permit 03478T46. This permit allows Duke to use a "halide salt" additive in its coal. Duke has submitted this application to remove all references to halide salts, and no longer plans to use these additives.

2. Discussion:

Duke initially submitted the request to remove halide salt from the permit as a "502(b)(10)" modification. However, because this action would remove an emission limit from the permit, this is being processed as a one-step significant modification.

The application explains that Duke initially planned to use halide salt additives in order to comply with mercury emission limits under 40 CFR Part 63, Subpart UUUUU (aka MATS or the EGU MACT). Duke requested to add halide salts to the permit in application .15D, and this was incorporated into the T43 permit.

Since initially applying to use halide salts, Duke has discovered that this additive is not necessary for compliance with Subpart UUUUU. Therefore, Duke no longer plans to use these additives and wants all references thereto removed from the permit:

The existing permit contains a PSD avoidance limit regarding PM2.5 emissions related to the use of the halide salt additives. Now that halide salts have been removed from the facility, this limit will be removed from the permit.

Based on the T43 permit review (Rahul Thaker; March 8, 2016), potential post-control emissions of PM2.5 from the use of halide salts was calculated as 7.5 ton/yr. Attachment 2 to this review contains the sections of the T41 permit review that are relevant to the use of halide salts.

For a complete list of changes, see Attachment 1 to this review.

3. Application Chronology:

- June 19, 2017 Application received.
- July 17, 2017 An initial draft of the permit and review were sent to DAQ staff (Tom Anderson, Mark Cuilla, Samir Parekh, Matthew Mahler, Charles Mceachern) and Duke staff (Erin Wallace). For a summary of comments received, see Attachment 3.
- July 27, 2017 Erin Wallace sent an email confirming that the facility name should be "Duke Energy Progress, LLC – Mayo Electric Generating Plant".
- XXXXX Public / EPA notice
- XXXXX Permit issued.

4. Recommendations

Issue permit 03478T46.

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Change List

Insert list from final permit

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Excerpt from T43 Permit Review

(Rahul Thaker; March 8, 2016)

5.3 Use of Halide Salts to Comply with MATS

Mercury may be found in two forms in the flue gases of the coal-fired boilers: elemental mercury (Hg^0) and oxidized mercury (Hg^{+2}). Control devices along the flue gas path can alter the oxidation state of mercury and the overall control efficiency for mercury. The oxidized form is the most readily controlled by the existing control device; therefore, it would be advisable to convert as much as elemental mercury to the oxidized form so that the material does not revert back to the elemental state.

DEP has determined that the addition of a chemical additive to the incoming coal may be needed on a periodic basis to ensure that the mercury is adequately oxidized in the combustion process and captured in the down-stream control device, wet flue gas de-sulfurization system (FGD) (currently existing selective catalytic reduction (SCR) system is responsible for enhancing the oxidation mercury). The Permittee states that additive material is needed to ensure that these EGUs continuously meet the mercury emission standards in MATS. The material will be used on an as-needed basis and dosage rates will normally be between 4-8 gallons per hour. The chemical will be stored in portable totes and moved around the facility as necessary. Therefore, as per the Permittee, no emissions are associated with the storage and delivery of the material to the coal feeders.

The Permittee has provided emissions calculations assuming all halide salts in the form of calcium bromide and in the form of particulates, unreacted in the combustion process. DEP has assumed a nominal application rate of 60.75 gallons/hr with a density of 14.1 lb/gallon and a combined removal efficiency of 99.8% (both ESP and scrubber). Based on these assumptions the after control emissions for PM_{2.5} would be 7.5 tons/yr, which is less than the significance threshold of 10 tons/yr.

The above regulatory applicability (to avoid PSD) determination approach, as proposed by DEP, involves a number of assumptions as outlined. If adopted, it can require a rigorous monitoring for compliance to verify various assumptions. More simplified approach can include assumption of all halide salts consumed in combustion process released into the atmosphere (with no control of ESP and/or FGD), which is a very conservative approach. The revised permit will include a PSD avoidance stipulation to limit PM_{2.5} emissions to less than 10 tons per consecutive 12-month period assuming all halide salts introduced in the combustion process released into the atmosphere. DAQ has assumed on a worst-case basis that all PM emissions will be in the form of PM_{2.5} and thus the avoidance limit will be based upon 10 tons/yr on a 12-month rolling basis. The stipulation will include requirements for monthly emission calculations for PM_{2.5} when injecting halide salts with coal in the above boilers, and associated recordkeeping ((logbook (written or electronic)) and reporting (semi-annual basis).

Separately, it needs to be described here that the applicant had submitted to the DAQ an application on December 11, 2012 to determine whether activated carbon injection (ACI) would be an appropriate approach to control elemental mercury emissions from the EGUs if the existing wet FGD is not effective in controlling mercury emissions. The activated carbon is injected in the ductwork of the flue gas downstream of the air preheater and prior to the FGD system. It is expected to bind the elemental carbon which would be then removed in the scrubber. Although this particular project was a trial request for two weeks, the DAQ had permitted it to be an all-year operation (8760 hours) and included a PSD avoidance limit of less than 10 tons/yr for PM_{2.5} emissions on February 26, 2013. Refer to Section 2.1 A.6. of the current permit.

The halide salts project as described above and proposed in this application was submitted by the applicant on March 9, 2015. The objective of this project is to ensure that mercury is adequately oxidized

if the existing SCR does not perform as expected. The halide salts would be injected with the incoming coal in the boiler.

Both of these projects are mutually independent with respect to technical and economic standpoints. Each would be operated independent of the other as they perform different functions and act as back-up controls for separate control devices as described above. Moreover, as stated above, each of these projects were developed more than two years apart from each other.

Considering all of the above, the DAQ has determined that each of these projects are separate projects for permitting and their emissions need not be aggregated for PSD applicability. This DAQ determination is consistent with the EPA memorandum dated June 23, 1993 on “Applicability of New Source Review Circumvention, Guidance to 3M – Maplewood, Minnesota”.

Thus, consistent with the above determination, a separate PSD avoidance limit of less than 10 tons/yr for PM_{2.5} for the halide project is appropriate and will be included in the revised permit as stated above.

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Comments on Initial Draft

- Mark Cuilla, by email on July 19, 2017

1. Mark pointed out typos in the permit and review.

Response: Fixed.

2. Mark requested that the portions of the T43 permit review relevant to halide salts be added to this review.

Response: Done.

- Erin Wallace, by email on July 24, 2017

1. The facility name should not be changed as in the draft. The proper name is "Duke Energy Progress, LLC - Mayo Electric Generating Plant", and the DAQ database should be corrected to show this

Response: Fixed.

2. In the newest version of the General Conditions, Condition MM is no longer noted as "State-enforceable only". Does this mean it is now considered Federally enforceable?

Response: Yes.

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